Claims

1. A method of processing a single channel audio signal to provide an audio signal having left and right channels corresponding to a virtual sound source at a given direction in space relative to a preferred position of a listener in use, the space including a forward hemisphere and a rearward hemisphere relative to said preferred position, the information in the channels including cues for perception of the direction of said single channel audio signal from said preferred position, the method including the steps of: i) providing a two channel signal having the same single channel signal in the two channels; ii) modifying the two channel signal by modifying both of the channels using one of a plurality of head response transfer functions to provide a right signal in one channel for the right ear of a listener and a left signal in the other channel for the left ear of the listener; iii) introducing a time delay between the channels corresponding to the inter-aural time difference for a signal coming from said given direction, characterised in that the method further includes filtering the signal in both channels using high frequency (HF) cut filter means, the filter characteristics of the HF-cut filter means being settable according to the given direction of the virtual sound source.

2. A method as claimed in claim 1 in which the amount of HF-cut filtering is at a maximum for virtual sound sources placed directly behind the preferred position of the listener, that is, at a direction of azimuth ±180° and elevation 0° relative to the preferred position of the listener, and the amount of HF-cut filtering progressively decreases as the forward hemisphere is approached.

3. A method as claimed in claim 1 in which there is zero HF-cut filtering for virtual sound sources placed at directions of azimuth between 0° and ±90°, relative to the preferred position of the listener.

4. A method as claimed in claim 1 in which the left and right channel signals are processed by transaural crosstalk cancellation means in order to give loudspeaker compatible signals.

5. A method as claimed in claim 1 in which the coefficients of the HF-cut filter means are set according to a function of the angle of azimuth and the angle of elevation of the virtual sound source.

6. A method as claimed in claim 1 in which the amount of HF-cut filtering is substantially the same for virtual sound sources placed at positions on the rear hemisphere which are

equidistant from azimuth ±180° and elevation 0° relative to the preferred position of the listener.

7. A method as claimed in claim 1, in which the coefficients of the HF-cut filter means are set via a look-up table.

8. A method as claimed in claim 1 in which at the HF-cut filter means is used in series with an HRTF.

9. A method as claimed in claim 1 in which an HRTF is convolved with an HF-cut filter means to produce a modified HRTF.

10. Apparatus for performing the method as claimed in claim 1, including signal processing means, HRTF filter means, HF-cut filter means, and a means for determining HF-cut filter coefficients as a function of the direction of the virtual sound source.

11. A computer program for implementing the method as claimed in claim 1.

12. An audio signal processed by the method as claimed in claim 1.

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